Simplex Method.

$Z = 3x + 5y$ subject to $x + y \leq 4$, $x + 3y \leq 6$.

1. Stack variable

$x + y + S_1 = 4$ — (1)

$x + 3y + S_2 = 6$ — (2)

$Z = 3x + 5y + 0S_1 + 0S_2$.

initial simplex table.

	cj	3	5	0	0		
CBj	Basic variable	x	y	s_1	s_2	sol	ratio.
0	s_1	1	1	1	0	4	$\frac{4}{1}=1$
0	s_2	1	3	0	1	6	$\frac{6}{2}=2$
$\Sigma CBi\,x$	z_j	0	0	0	0	0	
	c_j-z_j	3	5	0	0		

min s_2 → leaving element

$c_j - z_j \leq 0$.

Iteration 2. $z = 3x + 5y + 0s_1 + 0s_2$.

CBj	BV	x	y	s_1	s_2	sol	ratio.
0	s_1	2/3	0	1	-1/3	2.	$\frac{2}{2/3}=3$
5	y	1/3	1	0	1/3	2.	6.

This row is ÷ by 3

$1 - 1 \times \frac{1}{3} = 1 - \frac{1}{3} = \frac{3-1}{3} = \frac{2}{3}$.

$= 1 - 1/3$

$1 - 1 \times 1 = 1 - 1 = 0$.

$1 - 1 \times 0 = 1$

$0 - 1 \times \frac{1}{3} = 0 - \frac{1}{3} = \frac{-1}{3}$.

$4 - 1 \times 2 = 2$.

	y	1/3	1	0	
	z	5/3	5	0	5/3
	$c_j - z$	4/3	0	0	-5/3.

Iteration - 3.

CBi	BV	x	y	S1	S2	sol	rat
3	x	1	0	3/2	-1/2	3	
5	y	0	1	-1/2	1/2	1	
	Zi°	3	5	1/2	1		
	Cj - Zi	0	0	-1/2	-1		

$C_j - Z_i \leq 0$.

$Z = 3(3) + 5(1) + 0S_1 + 0S_2$

$= 9 + 5 + 0 + 0$ $\boxed{Z = 14}$

Feasible solution.

$(x, y, S_1, S_2) = (3, 1, 0, 0)$